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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/027,772	12/20/2001	Wieslaw J. Staszewski	12304-003001 / SWH/AVK/P7	9551

26161 7590 07/23/2003

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EXAMINER	
TSAI, CAROL S W	

ART UNIT	PAPER NUMBER
2857	

DATE MAILED: 07/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/027,772	STASZEWSKI, WIESLAW J.	
	Examiner	Art Unit	
	Carol S Tsai	2857	

-- The MAILING DATE of this communication appears on the cover sheet with the corresp ndenc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 December 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22,24-45,47 and 48* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,10-22,24-27,29,30,33-45,47 and 48* is/are rejected.

7)☒ Claim(s) *5,8,9,28,31 and 32* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 7 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 10-17, 20, 21, 24, 33-40, 43, 44, 47, and 48 are rejected under 35 U.S.C. 102(e) as being anticipated by U. S. Publication 2003/0009300 to Giurgiutiu.

With respect to claims 1, 24, and 47, Giurgiutiu discloses a method of determining the structural health of a body, the method comprising the steps of identifying at least one phase characteristic of a signal represented by first data, the first data being derived from the body while bearing at least a guided wave produced in response to application of at least one excitation signal to the body, and providing a measure of the structural health of the body using the at least one phase characteristic (see paragraphs 0030-0033; 0043-0045; and 0047-0053).

As to claims 10 and 33, Giurgiutiu also disclose identifying the magnitude of the instantaneous phase difference between the first and second data (see paragraphs 0030-0033).

As to claims 11 and 34, Giurgiutiu also discloses the guided wave being a Lamb wave (see paragraph 0034).

As to claims 12-14 and 35-37, Giurgiutiu also disclose attaching a first transducer to the body and applying the excitation signal to the first transducer to induce the propagation of the guided wave within the body (see paragraph 0030).

As to claims 15, 17, 38, and 40, Giurgiutiu also discloses at least one excitation signal applied to a transducer being arranged to produce a guided wave having a predetermined frequency (see paragraphs 0006 and 0025).

As to claims 16 and 39, Giurgiutiu also discloses the predetermined frequency being selected according to the dimensions of an anticipated defect within the body (see paragraph 0032).

As to claims 20, 21, 43, and 44, Giurgiutiu also discloses at least one excitation frequency being selected to include a predetermined mode of propagation of the guided wave within the body (see paragraphs 0030-0034).

As to claim 48, Giurgiutiu also discloses a computer readable storage medium having stored thereon a computer program element (see paragraph 0039).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 2-4, 22, and 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Giurgiutiu in view of U. S. Publication 2003/0065482 to Bechhoefer.

As noted above, with respect to claims 2-4, 22, and 25-27, Giurgiutiu discloses the claimed

invention, except for calculating a phase modulation of the first data using $\varnothing$ (t) = arctan û(t)/ u(t), where û(t) is the Hilbert transform of the signal represented by the first data and u(t) is the signal represented by the first data.

Bechhoefer teaches calculating a phase modulation of the first data using $\varnothing$ (t) = arctan û(t)/u(t), where û(t) is the Hilbert transform of the signal represented by the first data and u(t) is the signal represented by the first data (see paragraphs 0095-1018).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Giurgiutiu's method to include calculating a phase modulation of the first data using $\varnothing$ (t) = arctan û(t)/u(t), where û(t) is the Hilbert transform of the signal represented by the first data and u(t) is the signal represented by the first data, as taught by Bechhoefer, in order that unusual vibration can be obtained to determine the health of component, such as an aircraft component (see Abstract, lines 1-3).

5. Claims 6, 7, 29, 30, and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Giurgiutiu in view of U. S. Patent No. 6,006,163 to Lichtenwalner et al.

As noted above, with respect to claims 6, 7, 29, 30, and 45, Giurgiutiu discloses the claimed invention, except for comparing the first data with second data, representing the excitation signal launched into body to produce a guided wave within the body, to identify a phase difference between the first and second data; and in which the at least one phase characteristic comprises the phase difference.

Lichtenwalner et al. teach comparing the first data with second data, representing the excitation signal launched into body to produce a guided wave within the body, to identify a phase difference between the first and second data; and in which the at least one phase characteristic comprises the phase difference (see col. 4, lines 25-67; col. 7, lines 25-40; and col. 11, lines 34-42).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Giurgiutiu's method to include comparing the first data with second data, representing the excitation signal launched into body to produce a guided wave within the body, to identify a phase difference between the first and second data; and in which the at least one phase characteristic comprises the phase difference, as taught by Lichtenwalner et al., in order that the severity of damage in the structure can be detect, localize, and assess.

6. Claims 18, 19, 41, and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Giurgiutiu in view of U. S. Patent No. 5,932,806 to Rose et al.

As noted above, with respect to claims 18, 19, 41, and 42, Giurgiutiu discloses the claimed invention, except for at least one predetermined frequency component comprising at least one frequency component in the range of 80 KHz to 10MHz.

Rose et al. teach at least one predetermined frequency component comprising at least one frequency component in the range of 80 KHz to 10MHz (see col. 9, lines 31-37).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Giurgiutiu's method to include at least one predetermined frequency component comprising at least one frequency component in the range of 80 KHz to

10MHz, as taught by Rose et al., in order that guided waves can be induced into the structure as the transducer is electrically excited with a high-frequency harmonic signal.

Allowable Subject Matter

7. Claims 5, 8, 9, 28, 31, and 32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Watters et al. disclose wireless interrogation systems and methods that rely on a complementary sensing device and interrogator.

Light et al. disclose a method and apparatus for implementing magnetostrictive sensor techniques for the nondestructive short term inspection or long term monitoring of a structure.

Zediker et al. disclose a method for compensating a reference signal used in a coherent receiver of a micro-doppler sensor having a transmitter including the steps for: (a) repeatedly measuring phase differences between a signal emitted by the transmitter a first time and a previous signal emitted at a previous time so as to produce a plurality of phase error signals; (b) accumulating the phase error signals over a propagation time between the transmitter and the coherent receiver so as to produce a cumulative phase error signal; and (c) modulating a signal produced by the transmitter at the end of the propagation period so as to generate a compensated

reference signal having a phase characteristic substantially identical to the signal produced by the transmitter at the beginning of the propagation period.

Schoess discloses an acoustic rotor monitor that is an autonomous self-powered measurement instrument which can detect embedded and hidden fatigue cracks in remotely inaccessible devices such as helicopter rotor system components.

Lang et al. disclose an improved method and apparatus for detecting and identifying one or more resonantly vibrating blades of a turbine through the use of acoustic sensors imbedded in the stationary casing of the turbine.

Aussel discloses frequency broadband measurement of the characteristics of acoustic waves propagating in an object.

Arcas et al. disclose apparatus and method for determining the steady state flow resistance of face sheets on fully assembled acoustic duct liners.

Contact Information

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carol S. Tsai whose telephone number is (703) 305-0851. The examiner can normally be reached on Monday-Friday from 7:30 AM to 4:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S. Hoff can be reached on (703) 308-1677. The fax number for TC 2800 is (703) 308-7382. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the TC 2800 receptionist whose telephone number is (703) 308-1782.

In order to reduce pendency and avoid potential delays, Group 2800 is encouraging FAXing of responses to Office actions directly into the Group at (703) 308-7382. This practice may be used for filing papers not requiring a fee. It may also be used for filing papers which require a fee by applicants who authorize charges to a PTO deposit account. Please identify the examiner and art unit at the top of your cover sheet. Papers submitted via FAX into Group 2800 will be promptly forwarded to the examiner.

Carol S. Tsai

07/07/03

MARC S. HOFF
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